

2016

## IMSEnews 2016 Issue 1

Iowa State University Department of Industrial and Manufacturing Systems Engineering

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## IN THIS ISSUE

ATHENA LAB DEDICATED TO AUGMENTING,  
UNDERSTANDING HUMAN PERFORMANCE PAGE 4

MEET IMSE STUDENT SERVICES PAGE 7

CAPSTONE DESIGN COURSE PROJECTS  
AVERAGE \$137,800 IN 3-YEAR NET  
ECONOMIC BENEFITS TO IOWA COMPANIES PAGE 8



## Letter from the Chair

It has been my honor to lead the Department of Industrial and Manufacturing Systems Engineering during the last year. It has been exciting to see the department grow in terms of research and education. We interviewed several excellent candidates for the department chair position, and pleased that Gül Kremer has agreed to serve as the next chair.

The senior capstone design course has always been an important part of our undergraduate education. The feature article discusses how we have continued to build upon the tradition. Within the college, we are the only department with all of the projects originating from company sponsors. IMSE believes it is important that we maintain small groups of four students and unique projects for each group despite our growth.

Speaking of growth, we were just shy of 600 undergraduates prior to Spring graduation, and expect to exceed this value in the Fall. Our resident historians tell us that this will be a record enrollment for the department, surpassing the student population reached in the 1980's.

We are offering additional lecture sections to reduce the size of our classes and taking other measures to maintain the community within the department that we value.

Also, to support the growing number of students, we added an additional academic adviser in January. You can read more about all of the student services staff in the pages that follow.

In March 2016, we hosted four prominent industrial engineering faculty from outside of Iowa State University, as part of a regular review required by the Iowa Board of Regents. This team applauded the friendly atmosphere among IMSE faculty, staff and students, and were impressed with our increased research funding and our teaching laboratories, including the collaboration with other departments. They noted that we still have room to grow our PhD student population and the importance of fundraising to support initiatives to raise the prominence of our department in the national scene.

As you will read on the facing page, we received a generous gift from an alum of our department for which we are very grateful for. John Slater, a 1943

graduate, recently provided support to purchase a major piece of equipment and conduct research which will lead to software development that will assist design engineers to consider sustainability aspects of their design along with performance, cost and deliverability. Thank you, Mr. Slater, for helping IMSE stay on the forefront of advanced manufacturing.

As the new school year begins, I would to thank everyone for the support and encouragement they provided me personally, and the support to the IMSE Department.



Frank Peters  
Interim Department Chair  
Associate Professor



## Gül Kremer named new IMSE department chair

**Gül Kremer** has been named the C.G. "Turk" & Joyce A. Therildsen Department Chair in Industrial and Manufacturing Systems Engineering at Iowa State University. Her appointment officially began Aug. 16.

Since 2013, Kremer has held the position of professor of engineering design and industrial engineering at The Pennsylvania State University; and program officer in the Division of Undergraduate Education at the National Science Foundation. She served as a Fulbright Scholar at the Dublin Institute of Technology in Ireland from 2010-11 and held other professor positions at Penn State beginning in 2000. A Fellow of the American Society for Mechanical Engineers and a senior member of the Institute of Industrial & Systems Engineers, Kremer is the recipient of several best paper and teaching awards.



Kremer

"Gül is passionate about providing students the highest quality education, and we look forward to her contributions in this leadership role," said Sarah Rajala, dean of the College of Engineering. "She will continue the positive and collaborative atmosphere in the department and has strong support from the faculty and staff."

Kremer says she is excited about this new opportunity. "I will be surrounded by great people in this department, and I am looking forward to sharing my vision to further advance the department and contribute to the excellent reputation of the college," Kremer said. "I look forward to calling the beautiful Ames community home and becoming a Cyclone!"

Kremer holds bachelor and master degrees from the Yıldız Technical University in Istanbul, Turkey; an MBA from Istanbul University and a Ph.D. from Missouri University of Science and Technology.

-Contributed by ECR

## On the cover

IE capstone design students **Justin Danko, Daniel Thayer, Emilee Nyberg,** and **Matt Ehresmann** worked on a project with Seneca Tank to increase efficiency on the company's Ready-To-Deliver 2700 tank truck (pictured).

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# Alumni gift provides support for research of sustainability in advanced manufacturing



*Dr. Frank Peters, interim department chair for industrial and manufacturing systems engineering; John B. Slater (BSENG'43); and Cory Hansen, senior director of development for the ISU Foundation, stand in front of a HAAS vertical milling machine while recently visiting the Digital Manufacturing And Design Innovation Institute in Chicago, IL.*

An Iowa State University alumnus has made a generous gift to establish the Slater Fund for Advanced Manufacturing. The fund will assist the Department of Industrial and Manufacturing Systems Engineering in purchasing a 3D metal printer and developing software to enable design engineers to improve the manufacturability and sustainability of their component designs.

**John B. Slater** (BSEng'43) is passionate about the environment and sustainability, which led to his interest in the research that could be done at Iowa State. The machine is necessary to continue work in understanding the true optimization between the traditional and future processes and build a software tool for today and the coming decades.

The machine, a new HAAS UMC 750 5-Axis Vertical Machining Center outfitted with an AMBIT 3D Laser Deposition Head, will be housed in the Rapid Manufacturing and Prototyping Laboratory (RMPL), run by Matt Frank, associate professor of industrial and manufacturing systems engineering.

"This will be the first machine on campus, and one of few in the US, with 'hybrid' capability, able to both 3D print and machine in one system," Frank said. "This machine will allow us to be on the cutting edge of research in metal part manufacturing, complementing our current array of both additive and subtractive systems in the laboratory."

The overall objective of the software development is to determine the optimal combination of traditional manufacturing processes (machining, welding, casting, forging, etc.) and 3D printing. Such a tool will enable better decision making earlier in the design process leading to more sustainable and profitable outcomes.

Slater was an active student who went on to a successful career in the manufacturing industry. While on campus, he was President of the Student Body, an active member of Phi Delta Theta Fraternity, earned a letter in swimming, and served with the U.S. Army Corps of Engineers in WWII. He earned his degree from the Department of General Engineering, which was the department that evolved into today's IMSE Department.

The Slater Fund for Advanced Manufacturing was established with a gift made through the Iowa State University Foundation, a private, nonprofit corporation dedicated to securing and managing gifts and grants that benefit Iowa State University.





*Left: Iowa State University's Richard Stone and Thomas Schnieders, left to right, are co-founders of the ATHENA Lab. The lab is all about using engineering to augment and understand human performance. Photo by Christopher Gannon.*

*Below: The Athena Lab logo*



## ATHENA Lab dedicated to augmenting, understanding human performance

The first thing you noticed during a visit to a new Iowa State University engineering laboratory was the full-sized mannequin lying across a table. That's for studies to improve suturing techniques and tools.

Then there was a bin full of basketball shoes. Those are for studies of tread patterns and their effects on traction and performance.

Then there was a bigger-than-a-toy, remote-control land rover sitting on a shelf. It's for studies to improve the controls for machines and robots.

Back in one corner were cabinets filled with capacitors, chips and other electronics. In another corner was a roll of Kevlar for a study of body armor. Nearby was a box of cameras for recording data. There was a big fish tank for measuring volume and testing waterproofing technologies. Up on a top shelf were welding masks leftover from previous studies of welder training. Down below were groceries and other products for studies of the best placement of UPC codes on packaging.

"We have lots of different projects and we're always doing something here," said **Thomas Schnieders**, a master's student in human computer interaction and industrial engineering who's also the co-founder and coordinator of Iowa State's new ATHENA Lab.

That's the Augmentation and Training of Humans with Engineering in North America Lab.

"In this lab, we take humans and make them better," said **Richard T. Stone**, an associate professor of industrial and manufacturing systems engineering who's also the director and co-founder of the lab. "Through technology, training and the principles of engineering, we can make most tasks better."

Stone and Schnieders established the ATHENA Lab in November 2015. It grew out of Stone's previous lab, the Human Performance and Cognitive Engineering Lab, established when Stone came to Iowa State in 2008. The new lab is now recognized by the Augmented Human International Conferences Series as one of four augmented human research labs in the world and the only one in North America.

Stone said developing more effective and comfortable body armor for soldiers and police officers is an example of augmented human research. Another example is figuring out better and faster training routines for welders.

"Our mission is to be always focused on the human," Stone said. "And as our work has evolved, we're now more focused on augmentation."

Schnieders, for example, is working on an exoskeleton designed to help soldiers and police officers learn to fire handguns. The training tool is made of sheet metal and wraps around a wrist like a sleeve. It's designed to help trainees quickly develop the muscle memory for skillful and accurate shooting.

Wear the exoskeleton, and it's a little like a firearm instructor holding your hand to help with wrist and finger control.

The technology could be paired with a laser gun, making training easier and cheaper than live-fire exercises, Schnieders said.

The lab is spilling over with other projects and data-gathering tools. It supports the research work of 13 graduate students. It also supports courses in occupational biomechanics, human factors, applied ergonomics and work design, cognitive engineering and human factors in product design.

And it supports the idea that engineering can augment human performance and help to understand human capabilities.

"Enhancing performance, by itself, doesn't encapsulate what we mean by augmentation," Stone said. "A lot of what we do here in the ATHENA Lab is to enhance capability while preserving safety and quality of life."

*Contributed by News Service*

# Presidential research initiative builds, advances four big data research teams

Three IMSE faculty are on big data research teams that received awards from Iowa State University's Presidential Initiative for Interdisciplinary Research that will help launch major projects in digital agriculture and intelligent text analysis.

The new awards are designed to strengthen data driven science on campus, build teams of faculty members across disciplines, create research partnerships beyond campus and eventually establish new research centers capable of winning external funding.

**Michael Dorneich**, associate professor, and **Caroline Krejci**, assistant professor

Big Data for Sustainable City Decision Making, \$50,000 for one year of planning and development, led by Ulrike Passe, associate professor of architecture and director of the Center for Building Energy Research. The team aims to develop data-intensive decision-making systems to help decision makers create more livable, sustainable and resilient cities. The team's initial focus will be on energy conservation policies.

**Stephen Gilbert**, assistant professor

An Automated Functional Language Extraction (AFLEX) System to Transform the Translation of STEM Research to Society, \$450,000 research support over three years, led by Annette O'Connor, professor of veterinary diagnostic and production animal medicine. The team will work to improve society's access to scientific research findings and enhance communication between scientists. They'll develop a system capable of identifying and extracting relevant data from the overwhelming amount of information in scientific texts.

## Rivero elected VP of IISE Technical Operations

**Iris Rivero**, associate professor and director of graduate education in industrial and manufacturing systems engineering, was elected to Vice President of Technical Operations of the Institute of Industrial and Systems Engineers. The Technical Operations Board develops policy and provides strategic direction for the effective operation of IISE's societies and divisions.



Rivero

## Min recognized for years of service at Iowa State

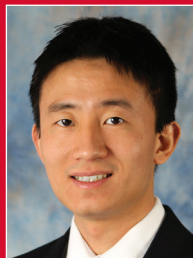
**K. Jo Min**, associate professor and director of undergraduate education in industrial and manufacturing systems engineering, is a recipient of the ISU 25 Year Award, which honors the loyal service of Iowa State University faculty, professional & scientific and merit staff members.



Min

## Hong selected as finalist in best paper prize

The 2016 International Conference on Continuous Optimization (ICCOPT) Best Paper Prize Committee selected Mingyi Hong, assistant professor in industrial and manufacturing systems engineering, as one of the three finalists for Best Paper Prize for Young Researchers in Continuous Optimization. His paper "Convergence Analysis Of Alternating Direction Method Of Multipliers For A Family Of Nonconvex Problems," with co-authors Zhi-Quan Luo and Meisam Razaviyayn, was accepted for publication in SIAM Journal on Optimization. The conference and paper competition will take place in Tokyo, Japan from August 8-11, 2016.



Hong

*Left to right: Anthony Greiter, grandson of Don Grant, Richard Stone, Annie Greiter, daughter of Don Grant, and Mary Margaret Gran, daughter of Don Grant, pose for a picture at the IMSE Spring Awards Banquet at Reiman Gardens.*



## Stone receives multiple honors for his dedication to quality education

**Richard T. Stone**, associate professor in industrial and manufacturing systems engineering, received the 2015 Plummer Memorial Education Lecture Award, which is a national award given to one person per year by the American Welding Society. This award has been established by the American Welding Society to recognize an outstanding individual who has made significant contributions to welding education and training, and to recognize Fred L. Plummer's service to the Society as President from 1952 to 1954 and Executive Director from 1957 to 1969.

Stone also received the Don Grant Faculty Award for Excellence in Undergraduate Education. The award is given to a faculty member in the department who is recognized by students as having a high impact on undergraduate education in our department. The undergraduate industrial engineering honor society, Alpha Pi Mu, presents this award based on voting by graduating seniors.

Grant served as an adviser and instructor in the department from 1968 to 1988, and it has been estimated that he worked with more than 3,000 students during his career at Iowa State.



# IMSE undergrad builds support for new company

**Charles Forey** (BSIE'16) achieved a great deal during his time as an industrial engineering undergraduate student at Iowa State. He performed very well in multiple academic competitions, as well as created his own company, U Medical Solutions.

The company, which is an Iowa-based LLC, has developed products to allow individuals to live a longer, more independent life. The first product is a smart electric wheel for manual wheelchairs, called the Wheel-EZ, and the second product is a medical lift that has the ability to be used as a walker to assist people with ambulation. U Medical Solutions has completed a market viability study and has a prototype for each product that are patent-pending.

"These products will be able to track and collect both specific and valuable information," Forey said. "In return, individuals with ambulatory needs will experience the benefits of a new independence."

Forey formed the idea for the Wheel-EZ while studying abroad in Germany. A year later, he was accepted to the week-long Okoboji Entrepreneurship Institute (OEI) 2015.

"OEI 2015 was one of the greatest experiences of my college career," he said. "Throughout the week, I absorbed many lessons that gave me a different viewpoint on my beliefs about various aspects regarding entrepreneurship. It is what originally led me to start my own company."

He said the biggest lesson he learned is just to start work and to figure things out as he went.

"It has made me pursue things that I never dreamed I could do. I was able to leap over hurdles that I used to be stuck behind," Forey said.



**Forey**

The company participated in Spring 2016 Iowa State Mechanical Engineering Capstone Design Course by submitting a project for a student team. It is the first student-run business to submit a project to the capstone course. Forey said the capstone courses are great for students to work on the projects and gain real-world experience.

"I have noticed that not many students in the course have helped work on a startup company, and I have seen how enthusiastic they are working on this one," he said. "It has been absolutely amazing working with the 15 mechanical engineering students. They are all so intelligent with creative ideas, and I can truly not thank them enough."

Forey is excited about the future. The company was accepted into the Iowa State Startup Factory, which is a 52-week-long incubator program to assist new companies. The program supports the companies by providing capital for start-up costs.

U Medical Solutions will be submitting both products into the Mechanical Engineering Capstone Design Course, and the Wheel-EZ into the Electrical and Computer Engineering Capstone Design Course next fall.



*Above and left: The Wheel-EZ product from U Medical Solutions is designed to replace the former wheels on a manual wheelchair to allow the user to feel as though someone is pushing them from behind.*

## Additional honors:

His IE 441 Capstone Design group was selected to present their project at the General Donald R. Keith Memorial Capstone Conference at West Point Naval Academy in May. At the conference, undergraduate students from West Point and other universities present their capstone design projects to other students, judges, clients, and professors. (A full description of the trip to West Point can be found on pages 10-11.)

Forey was chosen as a finalist in the statewide Pappajohn Student Entrepreneurial Venture Competition. The competition is sponsored by John Pappajohn, Equity Dynamics, Inc., and is intended for Iowa university and college students with an interest in starting their own business. Plans are judged based on the plan's content and the business idea's viability.

He was selected as 1 of only five individuals to participate in an entrepreneurship pitch competition in front to the Dean's Advisory Council members.

He was a recipient of the \$2500 John and Mary Pappajohn Scholarship, which honors students who have started or who intend to establish their own business.

# Meet IMSE Student Services!

The IMSE Department has created a new Student Services end of the hallway, where undergraduate and graduate students can all go to get the help they need. Three academic advisers, Devna Popejoy-Sheriff, Heather Robinson, and Sabrina Shields-Cook, assist undergraduate students with academic issues such as scheduling classes. Deb McDonough and Laurie Hoifeldt work with graduate students, as well as helping with the undergraduate program. The five of them work together to ensure IMSE students get the best possible service to facilitate their education. The IMSE Department is lucky to have them! Learn a little about them by reading below.



*Above, left to right: Deb McDonough, graduate student services, Heather Robinson, academic adviser, Devna Popejoy-Sheriff, academic adviser, Sabrina Shields-Cook, academic adviser, and Laurie Hoifeldt, graduate student services.*

## Deb McDonough

graduated from Iowa State in 2014 and she is thrilled to be working for her alma mater.

"The IMSE Department is a fantastic place to work, and it is definitely the people make all the difference. We have such a diverse group of people in our department that there is never a dull moment!" she said.

Outside work, Deb enjoys making things with her hands: she makes jewelry, crochets, and sews. She loves spending time in her garden at home or at her cottage in Canada. She also really loves books and movies.

"I am a huge science fiction/fantasy nerd and I love Tolkien, Stargate, and Star Trek. I'm also a huge horror movie fanatic: from the old black and white films to modern thrillers," she said.

## Heather Robinson

enjoys meeting and getting to know all of the students in IMSE.

"I love hearing about all of their unique experiences and goals for the future," she said.

Heather spends her time outside work watching her three young children participate in their individual activities, including dance, gymnastics, Girl Scouts and soccer. She enjoys taking vacations anywhere with a water view, and her favorite spot is Tablerock Lake in Missouri.

Her family loves all things Disney and they enjoy vacationing at Walt Disney World. On one of her trips, she went on a backstage tour of the Magic Kingdom, and she has been in the utilidors underneath the park.

## Devna Popejoy-Sheriff

has worked for IMSE for many years, and she still enjoys getting to know the faculty, staff and students.

"Being here for so long, I can see how the department has changed, and yet it still maintains a friendly learning environment. It makes coming to work a pleasure," she said.

Devna loves sports, and is currently the adviser for the ISU Archery Club and the Women's Hockey club. She spends her time at home working on projects, including gardening and making stepping stones and wind chimes. She loves the water, especially when she and her husband visit their daughter in Los Angeles.

"There is no better sound in the world than waves coming against the beach and the smell of the sea air is like heaven to me," she said.

## Sabrina Shields-Cook

likes that the IMSE department is very student-centered.

"The faculty and staff genuinely care about students and want them to be successful," she said.

Sabrina worked for many years as a technical writer and editor before making a career change to become an academic adviser.

"Making the change shows how much I truly love my job and love working with students!" she said.

She spends most of her free time at home with her husband and four kids. They love travelling to Custer State Park in the Black Hills, and have vacationed there twice in the last four years and are planning to go back soon.

The two things she does for herself are singing in a women's choir (with Laurie, actually!) and participating in a book club.

## Laurie Hoifeldt

thinks IMSE is a great place to work. She said the atmosphere is friendly and open, and the care for students is evident.

Laurie's home is a musical one! She sings in three choirs and her husband teaches private voice lessons in their home, so there are always interesting people coming in.

She enjoys playing flute and painting. We have a messy, interesting backyard with a garden, with lots of critters (welcome and unwelcome!) and two enormous Great Pyrenees dogs, Poe and Shadow, who like to chase those critters.

Laurie enjoys spending time on their back deck in the evenings, and on lakes, when she is able. She has one daughter in Brooklyn, one in San Francisco, and a son in Iowa City, and likes traveling to see them.





Capstone design students Daniel Thayer, Justin Danko, Emilee Nyberg, and Matt Ehresmann worked on a project with Seneca Tank to increase efficiency on the company's Ready-To-Deliver 2700 tank truck (pictured).

## Capstone design course projects average \$137,800 in three-year net economic benefits to companies

Industrial Engineering Design (IE 441) is the one-semester senior design course where students engage in industry projects and practice industrial engineering under the guidance of an experienced Registered Professional Engineer, as well as engineers and managers from the sponsor company. The objective of these projects is to provide economic value to the company and a practical education to the students.

The average three-year net payback for 62 projects over the last five semesters is \$137,800, estimated by the sponsor companies and then verified by CIRAS (Center for Industrial Research and Service), serving as a third-party assessment. CIRAS also helps connect the companies to the student projects for the course.

One hundred percent of the projects are based in industry and give the students real problems to work on, with real constraints.

**Dave Sly**, professor of practice in industrial and manufacturing systems engineering, is the instructor for the course. He has been happy to see that the increased focus on client value has delivered great results for the companies as well as the students.

"The competitive nature of the students has shown through, as each semester's group has outperformed on value over the previous semester," he said.

The projects involve four stages of design (Problem Definition, Current State Analysis, Future State Design, and Final Project Validation/Delivery). Students are required to perform in-depth quantitative analysis and design throughout the entire project with a group commitment of 40 hours per week for 14 weeks.

Almost all of the companies are in Iowa, because extensive on-site and web/phone company involvement is necessary to ensure success. The groups are required to visit the companies at least five times per semester, but average more than ten visits.



Examples of other projects include a team working with Drake University to look at office efficiency, how information is presented to students, staffing, and office layout. A project with Hy-Vee distribution centers asked students to address efficiency of order placement and turnover in warehouses located in Sheraton and Cherokee. Fifteen projects were completed in Spring 2016, an increase from 12 projects in Fall 2015.

The participating companies include many manufacturing companies, and range from Fortune 500 companies to smaller companies with 30-40 employees. Companies that have participated in the program include Hagie, Tone's, Kinze, Lennox, John Deere, Rockwell Collins, Whirlpool and Iowa Health System, among others. About 60 percent of the companies return the following semester to participate again.

The hands-on experience the students get from these projects is invaluable, and is enhanced by the limit of four students to a team, ensuring each student has a lot of work to do on the project.

### Seneca Tank project

A Spring 2016 student group worked with Seneca Tank on the Ready-To-Deliver 2700 tank truck. Seneca Tank is located in Des Moines and is an international supplier of new and used petroleum tank trucks, transports, and truck tank parts. The students made recommendations to the company that would increase efficiency in the assembly process and introduce kits with standardized parts into the production process.

The student team members working on the project were industrial engineering seniors **Emilee Nyberg**, **Matt Ehresmann**, **Justin Danko** and junior **Daniel Thayer**. The team addressed issues with variability in Seneca Tank's manufacturing process of the Ready-To-Deliver 2700 tank truck, and had a one-year economic payback of \$600,000.

"The solutions we recommended focused on introducing kits into their production process to standardize the parts used and quantities needed for production," Ehresmann said. "We also made recommendations to increase the efficiency of their assembly process by reducing parts and operations."

The students can see the benefits the class project will have on their future careers.

"I believe that IE capstone is such a successful class because we get to take everything we learned in the classroom and apply it to the real world and truly make an impact on a company," Nyberg said.

The IMSE Department has increased its undergraduate curriculum focus on the practical experience students can gain.

"I believe that the IMSE capstone design course represents the IMSE curriculum perfectly. The curriculum focuses on applying industrial engineering principles within industry and that is what the IMSE capstone is all about. I believe this focus helps prepare students for the transition between academia and industry," Ehresmann said.

The students really enjoyed working with the employees and engineers at Seneca Tank, and the feeling was mutual.

"Seneca Tank is continually amazed by the capability and professionalism possessed by the students of Iowa State's Department of Industrial and Manufacturing Systems Engineering. We count it a privilege to support the program, and work side by side with these teams," said SJ Risewick, the student team's contact at Seneca Tank.



*Students from the Seneca Tank Spring 2016 project look at the rear of the Ready-To-Deliver 2700 tank truck, where the results of their work are visible.*





Photo 1 (Left)  
The team  
(L-R) AG  
Fleckenstein,  
Nicole  
Kittleson,  
CY, Madison  
Bishop, and  
Charlie Forey.



Photo 2 (Left) The team  
(with a Mary Greeley  
Medical Center engineer  
in the middle) on a tour  
of the Medical Center  
(under construction)  
after their capstone  
presentation to Mary  
Greeley personnel.

Photo 3 (Right) Hanging  
out at the mall.



# Photo story: Trip to NYC

Written by Mike Helwig

Photography by Kris Abel-Helwig

In April, the IMSE Department sent a team of students to the United States Military Academy at West Point, New York, to compete in the General Donald R. Keith Memorial Capstone Conference Competition. Students from various universities and military academies presented their capstone project results in one of nearly a dozen different tracks formats (including Decision Analysis, Process Optimization, Systems Design, and other tracks that are closely related to systems engineering).

The IMSE Department at Iowa State offers the course IE 441: Industrial Engineering Design, which is the culmination of many undergraduate courses, and is considered a capstone course for the undergraduate major. This challenging course addresses real-world industrial engineering-related problems and identifying efficiencies typically associated with industry. Eight student teams from this course competed for the opportunity to go to West Point, and after much deliberation, a team composed of **Nicole Kittleson, AG Fleckenstein, Madison Bishop, and Charlie Forey** was chosen to represent the IMSE Department. CY (the ISU mascot) was also chosen to make the trip (*Photo 1*). The team's capstone project focused on efficiencies and process improvements for Mary Greeley Medical Center in Ames, Iowa, and was considered outstanding in its content (*Photo 2*).



Photo 5. One of the capstone  
project judges discussing the  
presentation with the ISU team.





*Photo 4 (Left)  
The team just minutes before their capstone project presentation at West Point.*

*Photo 6 (Right)  
The team with a couple of West Point Cadets.*



So, at 4 a.m. on April 27th, my wife and I found ourselves driving to the Memorial Union in Ames to pick up four students, and off to New York we went! The students had a chance to explore the mall near our hotel (Photo 3) and practice their presentation several times, and then we called it a day.

The following day was the competition (Photo 4), and the team's presentation was awesome. It was made even more impressive by the fact that the students had very little time to prepare, since we were not even aware of the Capstone Conference opportunity until the last minute. Additionally, most capstone projects in the competition encompass an entire year, but at Iowa State, the project must be identified, analyzed, completed and results briefed to the client in only a semester.

While the team didn't win best presentation for their track, the presentation was eye-watering. One of the judges followed our team out of the room after the presentation and said he felt the project could be used as a basis for Six Sigma Green Belt certification, and that he was very impressed with the project (Photo 5).

After the presentation, we explored West Point for a bit (see photos 6 and 7), and enjoyed the reception that evening.

The next day, we went to New York City, where we were treated to a tour of Tory Burch. It turns out that IMSE alumnus and Industrial Advisory Council member Dave Rush is a Senior Vice President for Distribution and Logistics for Tory Burch, and we got a chance to visit with him (Photo 8).

We then walked around NYC for a bit (photo 9), and saw the Broadway musical *American Psycho* (thanks again Dave Rush!). Finally, back to the hotel and an early flight home to Ames.

So, did the students enjoy the trip? They indicated to me multiple times how much fun they were having, and how much they appreciated the chance to participate at the conference and to see New York City. The IMSE Department has a special graduation ceremony for their students each year, and students are asked to share with the audience their most memorable academic and non-academic moments of their four years at ISU. All four students cited the trip to West Point as one of their favorite memories, so I suspect the IMSE Department will endeavor to provide the opportunity for other ISU students to make the trip to New York in the future.

*I would like to express my gratitude to the IMSE Department at ISU for supporting this effort; to Dave Rush for his personal, professional and financial support which were most generous; to the United States Military Academy for making accommodations for our team after the registration deadline; to my wife Kris Abel-Helwig who took 3 billion pictures; and of course to Nicole Kittleson, AG Fleckenstein, Madison Bishop, and Charlie Forey – our students who represented ISU so professionally.*

*Photo 7 (Right)  
Sitting on a wall above the Hudson River, spelling out "ISU."*



*Photo 8 (Left) Dave Rush (center) with CY and the team at Tory Burch in New York City.*



*Photo 9 (Below) At Times Square in NYC.*



## IMSE graduate students and faculty attend IISE Conference

Multiple graduate students and faculty represented the IMSE Department at the Institute of Industrial & Systems Engineers Annual Conference and Expo at the Disneyland Resort Hotel in Anaheim, California on May 21-24, 2016. Included in attendance were **John Jackman**, associate professor in industrial and manufacturing systems engineering, and **Iris Rivero**, associate professor in industrial and manufacturing systems engineering. Jackman is president of the Manufacturing & Design Division Board, and Rivero is an advisory board member. **Matt Frank**, associate professor in industrial and manufacturing systems engineering, received the North Central Region Outstanding Faculty Advisor Award.

*Below: IMSE graduate students Michelle Zugg, Teri Craven, Anuj Mittal, and Fikri Kucuksayacigil watch over the Department of Industrial and Manufacturing Systems Engineering's booth at the conference. The students spoke with other conference visitors about the IMSE program at Iowa State.*



*Pictured left to right: Jared Hall, Chase Grimm, Molly Statz*

## Applying studies to real world issues

While he was growing up on a farm in the small community of Maynard, Iowa, **Chase Grimm** spent hours tinkering around with farm machinery and equipment, beginning his drive to learn more about manufacturing systems.

He says joining the industrial engineering program was an easy choice. "It seems like the broadest of all the engineering majors, and there is a lot of management positions in the field, which is something I can see myself doing," says Grimm.

Recently, Grimm and two friends submitted a proposal to NASA for the Micro-g NExT competition, a competition that challenges undergraduate students to design a device that addresses a current space exploration problem.

The competition brings together college students who are studying similar topics and allows them to apply their studies to real issues.

Grimm says the group chose to work on a surface sampling device that would be used on asteroids because each member had ideas of how they could create a design.

While he was excited when their proposal was selected to be tested in the Neutral Buoyancy Lab in Houston, he also realized they now had an arduous process laid out before them. That's because the proposal was originally a concept and not a functional design.

So, Grimm started from scratch to rebuild the design to work under certain parameters, such as under a certain weight, volume, dimension, and the ability to pick up an object that is 1/8 of an inch. They also had to make all hazards apparent on the device.

"We had to label all sharp edges or pinch points on the device, because in a practical situation this device would be used in space where it could potentially cut open an astronaut's suit," explains Grimm.

After the design was finished, the team took the design to Texas, where divers took the device to a depth of 7 feet. The team also gave a presentation about the design, which Grimm appreciated as it gave him a chance to practice his communication skills.

Even though there were no winners in the competition, Grimm says he wouldn't be surprised to see some of the work that was presented in future NASA designs.

"It was a great opportunity, and I gained a lot of great experience," he says.

Grimm hopes to someday work in the aerospace industry, but he's also considering pursuing research and continuing his education to receive a master's and eventually a Ph.D.

Learn more about the Iowa State Micro-g NExT team at: [www.ianauts.com](http://www.ianauts.com)

*-Contributed by ECR*



## IMSE senior selected for CYstarters program

A company co-founded by **Nick Herrig**, senior in industrial engineering, was selected to be part of the first summer "CYstarters" program with the Pappajohn Center for Entrepreneurship at Iowa State. The 10-week program takes place from May 23 to July 29.

It will allow teams access to between \$6,000-\$12,000 in funding, access to industry mentors, educational sessions, facility space at ISU Research Park, pitch opportunities and weekly accountability pitches to Pappajohn Center staff and mentors.

Herrig is the cofounder of Midwest Beer Club, which is a subscription-based, craft beer delivery system. Craft beer packages are selected for each customer based on their individual preferences and delivered to their doorstep each month.

## Graduate student excellence award nominees

The ISU Graduate College honors graduate students for research and teaching excellence, recognizing the "best of the best" graduating students who have submitted theses and dissertations and outstanding achievement in instruction.

**Matthew Goiffon** - Teaching Excellence Award, Spring 2016

**John Haughery** - Teaching Excellence Award, Fall 2015

**Mohammad Rahdar** - Research Excellence Award, Summer 2015

**Jacklin Stonewall** - Research Excellence Award, Spring 2016

**Daniel Van Groningen** - Teaching Excellence Award, Spring 2016

**Michelle Voelker** - Research Excellence Award, Spring 2016

# IE students make up majority of most recent student marshals

*With College of Engineering Student Marshal Michael Hoefer in Fall 2015, industrial engineering students have been selected for three of the last five semesters for marshal.*

## Fall 2015 Student Marshal: Michael Hoefer

**Michael Hoefer**, an industrial and manufacturing systems engineer, served as the College of Engineering Student Marshal during the Fall 2015 commencement ceremony. He was accompanied by Matt Frank, associate professor of industrial and manufacturing systems engineering, as he led the engineering class into the ceremony held December 19th.



Hoefer

Hoefer has shown tremendous leadership as a student and received the President's Leadership Initiative Award for his work. Throughout his career, he has served in the ISU Student Government as vice president, director of student affairs and College of Engineering senator.

His passion to lead has developed a passion to make a difference in his community. Hoefer led a project to install public bike repair stands on campus to support sustainable transportation, and he has began development with a team of students for, CySwap, a student marketplace that promotes reuse among students. Sustainability and reuse were also driving factors in Hoefer's honors project, which focused on economic modeling of wind turbine blade recycling.

Hoefer has been on the Dean's list every semester and has been inducted into the Tau Beta Pi and Cardinal Key Honor Society. He also served as a Destination Iowa State team leader three times, tutored students in statistics, and was an Ambassador for both IMSE and the College of Engineering. When he held a teaching assistant position, Hoefer organized class materials, graded and helped students excel in their coursework.

He's gained professional experience through multiple internships: Zirous Incorporated, where he was an application developer; Rockwell Collins, where he researched, planned, and justified an automated soldering system to improve quality and efficiency; and Boeing, where he led a team to implement warehouse automation at Boeing's composite manufacturing center to improve efficiency reduce defects. His endeavors also went overseas to Germany, where he ran an independent research product using big data and GIS software to find how mining impacts water quality in South Africa.

Hoefer is in the concurrent master of science program in industrial and manufacturing systems engineering. He is working as a graduate assistant in Rapid Manufacturing and Prototyping Lab and returned to Boeing for an internship. He plans to graduate in Fall 2016.

## Spring 2016 IMSE nominee for student marshal: Breanna Huth

**Breanna Huth**, an industrial and manufacturing systems engineer from Bondurant, Iowa, joined several campus organizations to make the most of her adventure at Iowa State.

She served in several leadership roles including secretary of her dorm floor; LAS representative for the Society of Chemistry Undergraduate Majors; middle school outreach chair, university co-chair, outreach director and after-school program coordinator for the Society of Women Engineers; and secretary for Alpha Pi Mu.



Huth

Huth was the events chair for the Institute of Industrial Engineers, and financial chair and partners program member for Society of International Engineers. She has also volunteered as an Engineer Career Fair ambassador; a coach for Special Olympics; an ambassador for prospective students through the Program for Women in Science and Engineering (WiSE) and the IMSE department; and a peer mentor for a combined three years in WiSE and Industrial Engineers are Leaders.

She interned as a product support intern with John Deere, a manufacturing engineer with Altec and a technical marketing intern with Caterpillar.



# Stanley wins Modern-Day Technology Leader Award

**Derrick Stanley** (MSSysEng'14) will receive a Modern-Day Technology Leader Award at the 2016 Black Engineer of the Year Awards (BEYA) STEM Conference held Feb. 18-20. The award highlights bright young men and women who are making strides in the STEM field and shaping the future of engineering, science, and technology.



**Stanley**

Stanley, a systems and materials engineer for Boeing, is originally from Tampa, Florida. He earned his master's from Iowa State in 2014 through the College of Engineering's Online Learning program. "I was looking for a really good distance education program for systems engineering, and Iowa State was the perfect fit," he says.

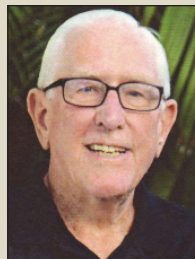
Stanley's work at Boeing involves system integration, cost affordability initiatives, and the material processes that are used to manufacture Boeing's space and defense products. Throughout his career, he has applied his technical skills in a variety of roles for the company: a materials engineer supporting Boeing's Space Launch System program; a structural analysis engineer on the 11/45 fuselage section of the 787 airplane; a systems engineer supporting the Ground-Based Midcourse Defense program; and a material review board engineer supporting the 737 Next Generation airplane program.

Stanley is a founding member of the National Society of Black Engineers (NSBE) at Embry-Riddle, where he serves as an adjunct assistant professor and teaches a course titled Application of Unmanned Systems.

*Contributed by Engineering College Relations*

## Building a successful career off the foundations he learned at Iowa State

Beginning his adventure in the fall of 1950, **Jerry Allen** (BSEngr'55) came to Iowa State University on a football scholarship. Allen hoped to undertake the industrial psychology program to learn how to understand a person better while still making a living.



**Allen**

But when Allen's father, who worked for John Deere, helped him receive a co-op with the company performing work similar to industrial engineering, Allen discovered his calling. He soon switched his major to industrial engineering, which was a sub-course labelled under general engineering at the time.

The next big change for Allen came during the fall of his sophomore year when he injured his ankle. The injury combined with the heavy course load required by the engineering program resulted in Allen dropping out of football. He had lived with other athletes in what is now the defunct Clyde William Field or "East Stadium," so he had to move to Friley Hall. He quickly adjusted to the new living quarters and was able to find a place to provide leadership to others as house president and eventually a resident assistant.

Being only one of six students in industrial engineering, Allen went on to help create the Industrial Engineer Honorary Society. He noted that being placed in honorary helped bolster the students' resumes. Eventually, the society would go on to be absorbed by the national organization.

During Allen's 5th and last year, he married his wife Bev, a University of Northern Iowa graduate. They lived together in Pammel Court, a housing complex originally made for the surge of enrollment from World War II veterans that were married.

After graduation in 1955, Allen's leadership opportunities at Iowa State University led him to success in his career. As a Department of Defense engineer, he served the Air Force in Japan where he was charged with relocating a military family housing facility to make way for the 1964 Tokyo Olympic Village. Later in Hawaii, he assisted the Pacific Air Force Command in developing air bases in Viet Nam and Thailand.

During Allen's time with the Naval Facilities Engineering Command (NAVFAC), he created a process that identified the optimal budget allocation for naval facilities all across the Pacific using regression analysis. Expecting backlash from field commanders, Allen's admiral remarked, "You are a real industrial engineer!" as there were no complaints about the new budget.

Allen enjoyed his time with NAVFAC but didn't like being away from his family for three to six weeks at a time. That's when he decided to move into the private industry and began dealing with the financial aspects of industrial engineering. This prospered into the position of vice president of corporate planning for the well-known company Mauna Loa Macadamia Nut Company.

Even though Allen has lived in Hawaii for a majority of his life, he has always felt a special connection to Iowa State University. Whenever alumni events are held in Hawaii, he always makes it a goal to attend, and he's a regular donor to the Iowa State University Foundation for the industrial engineering program. Allen has even been the tour guide for Iowa State University's previous president when he visited Hawaii.

According to Allen, Iowa State University taught him that there is always a way.

*Contributed by Engineering College Relations*

## Madden retires after 50 years of service

*ISU Senior Vice President for Business and Finance **Warren Madden** (BSIE'61) reflects on his tenure at Iowa State University and his time spent with the IMSE Department as a student.*

"As I complete fifty years of service at Iowa State University as the Senior Vice President for Business and Finance my undergraduate degree in Industrial Engineering was the foundation for much of my success. The educational program, relationships I had with faculty and other students and the campus experience which Iowa State still provides taught me the leadership skills and how to lead and work with teams. In addition to the fundamental skills an engineering degree provides it included the skills for analyzing and determining how to solve problems and working with people from very different backgrounds. During my career as technology has changed, the world has become smaller and more interconnected engineering provided the foundation for adjusting, working with the numerous Iowa State Presidents and other administrators. I had the opportunity to start out as an engineer working in an international corporation, move into management and then become a senior administrator at Iowa State. The foundation for my career was the engineering degree received at Iowa State. I continue to remember the faculty and class mates who played a role in my career."



**Madden**

***Frank Peters**, IMSE interim department chair and associate professor, presents the Joseph K. Walkup Prominence in Industrial Engineering Award to **Dan Wendt**.*



## Wendt honored for contributions to IE profession

Iowa State awarded **Dan Wendt** (BSIE'83) the 2015 Joseph K. Walkup Prominence in Industrial Engineering (PIE) Award. Wendt is the Vice President of Field Operation Effectiveness & Business Transformation for Ingersoll Rand. The award recognizes industrial engineers who have shown exemplary service to the department, have contributed to the advancement of the industrial engineering profession, and who have prominence and outstanding achievements in their chosen profession. Wendt received the award at a reception in 2004 Black Engineering in Fall 2015.

## Reichenberger named chair-elect of ISU Alumni Association Board of Directors

**Melanie J. Reichenberger**

(BSIE'00) was named the chair-elect for the Board of Directors of the Iowa State University Alumni Association. The Board establishes policies regarding the property, management, and activities of the Association to engage "markets" and "publics" for the further advancement of Iowa State University and the Alumni Association.



**Reichenberger**

Reichenberger is an attorney and partner at Michael Best & Friedrich LLP, a corporate law firm based in Milwaukee, Wis. She is a member of the firm's Intellectual Property Litigation Practice Group, where she works with clients to develop strategies for resolving intellectual property disputes both inside and outside of the courtroom. She received her law degree in 2006 from the University of Iowa College of Law, where she served as editor in chief of The Journal of Corporation Law. Before entering law school, she worked as a process engineer and manufacturing manager for Procter & Gamble. As an ISU student, Melanie was a Cyclone Aide and Engineers' Week co-chair and was a member of the Student Alumni Association (now Student Alumni Leadership Council), and several other organizations. Melanie has been recognized as a Wisconsin Rising Star in the area of intellectual property litigation by Super Lawyers Magazine. Melanie has served the ISUAA Board of Directors as the Vice Chair of Finance and Vice Chair of Records, has chaired the Board's Membership and Revenue Enhancement Committee, the Alumni Center Oversight Committee, Finance Committee, and has served on the Diversity and Inclusion Task Force.

*-Contributed by ISU Alumni Association*



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